ANIMAL ANATOMY:
CONVERGENT EVOLUTION

If two species face a similar problem, challenge, or opportunity, evolution may end up shaping them both in similar ways. This is how very different creatures like birds and bats can end up having very similar traits.

BAT

Body covered in fur

Wings connected to legs

Gives birth to live young

Elongated 'finger' bones with membranes stretched between

Cannot launch into air from ground

HAWK

Body covered in feathers

Free standing legs

-Lays eggs

-Fused arm and hand bones

-Can launch into air from ground or height

Birds and bats are often described as examples of **convergent evolution** because they both evolved wings that allow them to fly. However, some parts of their wing bones are **homologous** because they evolved from a common ancestor long ago.

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EEL

SEA SNAKE

ANIMAL ANATOMY: CONVERGENT EVOLUTION

If two species face a similar problem, challenge, or opportunity, evolution may end up shaping them both in similar ways. This process is called **convergent evolution**. Eels, sea snakes, and caecilians belong to three different classes of animals, but they all evolved very elongated bodies to suit their environments.

EELS	SEA SNAKES
	
°Fish	°Reptiles
°Breathe using gills	°Breathe using lungs
°Live only underwater	°Live mostly underwater
°Non-venomous	°Venomous (can paralyse or kill!)
°Most have no scales	°Visible scales
°Nocturnal	°Flat tail to propel them through water
°Blood toxic to humans	

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HEDGEHOG

PORCUPINE

ANIMAL ANATOMY:
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If two species face a similar problem, challenge, or opportunity, evolution may end up shaping them both in similar ways. Hedgehogs and porcupines have spines for protection, but that doesn't mean they share a spiny ancestory. Each evolved spines independently as a result of **convergent evolution**.

°Belongs to the order Insectivora

°Non-poisonous spines

°Nests under vegetation in farm-land, parks and gardens

°Short quills

°Grows to 4-12 inches long

°Rolls into a ball when threatened

°Belongs to the order Rodentia

°Spines are barbed and poisonous

°Lives in trees, deserts, grasslands and forests

°Long quills

°Can grow to 20-36 inches long

°Raises back and releases spines to deter predators

Both porcupines and hedgehogs are hunted by larger carnivorous animals. Evolving sharp, stiff spines makes them less likely to be eaten by foxes, big cats, or marsupial wolves, who would rather eat a less spiky dinner.

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DOLPHIN

SHARK

ANIMAL ANATOMY: CONVERGENT EVOLUTION

DOLPHIN

- Skeleton made of bone
- Goes to the surface and breathes through blowholes
- Nurses young

SHARK

- Skeleton made of cartilage
- Uses gills to get oxygen from water
- Does not nurse young

If two species face a similar problem, challenge, or opportunity, evolution may end up shaping them both in similar ways. Both dophins and sharks swim after prey in the ocean. Streamlined bodies and fins provide a big advantage for them, allowing them to swim faster

Since dolphins and sharks occupy similar niches and face similar challenges, similar adaptations have been helpful to them, resulting in their analogous structures.

These are just a few of the differences between sharks and dolphins. We know that they are not closely related, and they didn't inherit their similar body shapes from a common ancestor.

Their streamlined bodies, dorsal fins and flippers are a result of **convergent evolution**.

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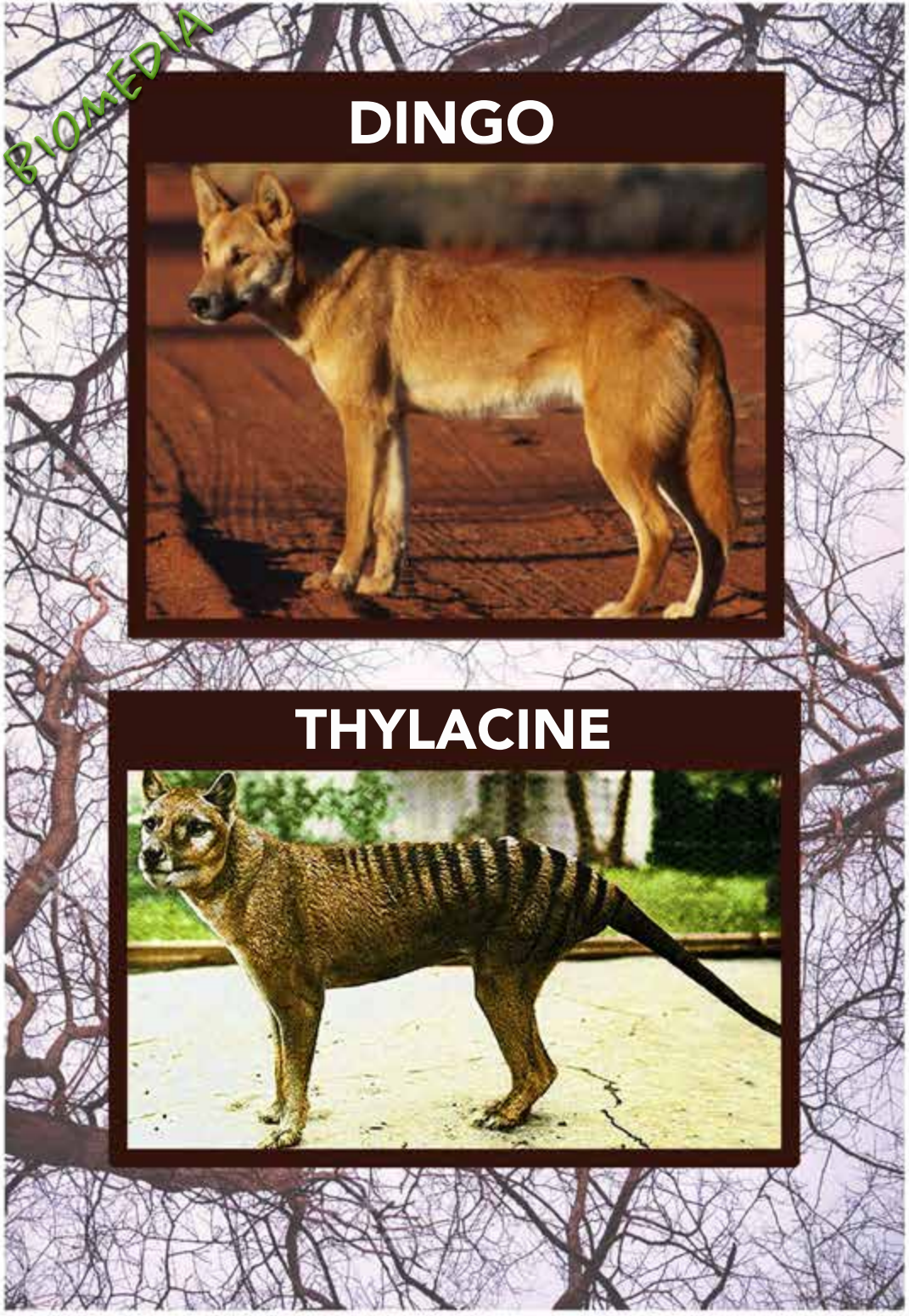

ANIMAL ANATOMY: CONVERGENT EVOLUTION

If two species face a similar problem, challenge, or opportunity, evolution may end up shaping them both in similar ways. The dingo and the now extinct thylacine (also known as a Tasmanian Tiger) look similar, and both were/ are found on the Australian continent.

However, the two animals had some very different traits:

THYLACINE

- °Pouched marsupial (related to kangaroos)
- °Thin, rodent-like tail
- °Timid & shy, could be captured without a fight
- °Could open mouth almost 90°
- °Made a yapping noise like a small dog

DINGO

- °From the canidae family, related to gray wolves
- °Howls instead of barking
- °Bushy tail
- °Can turn head up to 180°
- °Can rotate wrists (and even turn a doorknob!)

Dingos and thylacines are examples of **convergent evolution**, which occurs when animals with different ancestry develop similar features. Since the thylacine filled the same ecological niche in Australia as the dog family did elsewhere, it developed many of the same features, even though they are not directly related.

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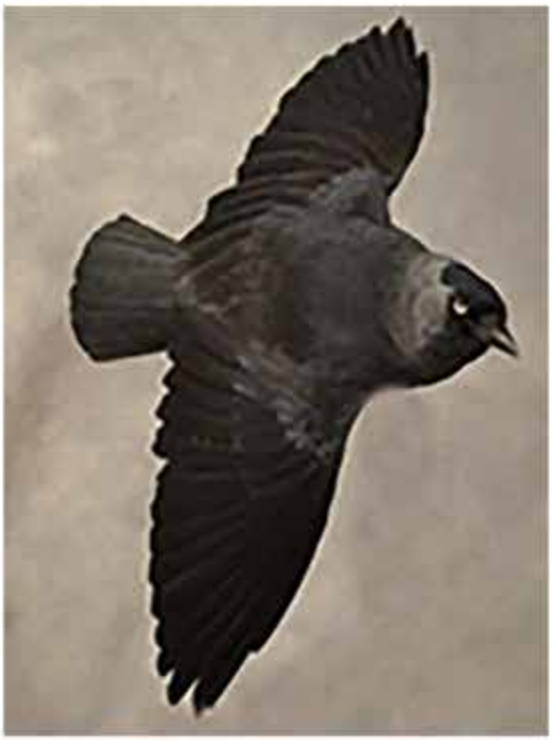
SWIFT



SWALLOW

ANIMAL ANATOMY: CONVERGENT EVOLUTION

If two species face a similar problem, challenge, or opportunity, evolution may end up shaping them both in similar ways. Swifts and swallows are both well-known birds in southern Africa. These two families of birds are often confused due to their similar bodies and behaviours. They both have streamlined bodies, often with a forked tail, small beaks, short legs that are unsuitable for walking and relatively long wings.

However, these two species have some notable differences:

SWIFTS

- °Black and white
- °Cannot perch; hangs on sides of cliffs or rocks
- °Builds nest by gluing together feathers and saliva
- °Makes a high-pitched screaming sound
- °Drinks, eats and sleeps while flying
- °Related to hummingbirds

SWALLOWS

- °Some blue iridescence red colouration
- °Pointed wings
- °Can perch on branches
- °Make nests from mud or in tree holes
- °Musical twittering sound

Resemblances between swifts and swallows are due to **convergent evolution**. Their similar lifestyle requires them to catch insects in flight, and as a result they evolved some of the same body mechanics, even though they don't share a recent common ancestor.

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FLYING SQUIRREL

SUGAR GLIDER

ANIMAL ANATOMY: CONVERGENT EVOLUTION

If two species face a similar problem, challenge, or opportunity, evolution may end up shaping them both in similar ways. The North American flying squirrel and the Australian sugar glider seem very similar: they are both nocturnal, have big, black eyes and long, bushy tails. Most of all, they both have skin stretching between their wrists and ankles that helps them to glide. But surprisingly, they are not closely related by a recent common ancestor, and they have a number of significant differences.

FLYING SQUIRREL

°Placental Mammal, from the order Rodentia

°Grows up to 12 inches long

°Can leave nest at 10 weeks

°Can fly up to 10 metres in one go

°Fur glows pink under ultraviolet light

SUGAR GLIDER

°Marsupial (pouched, related to kangaroos)

°Grows up to 8 inches long

°Striped head

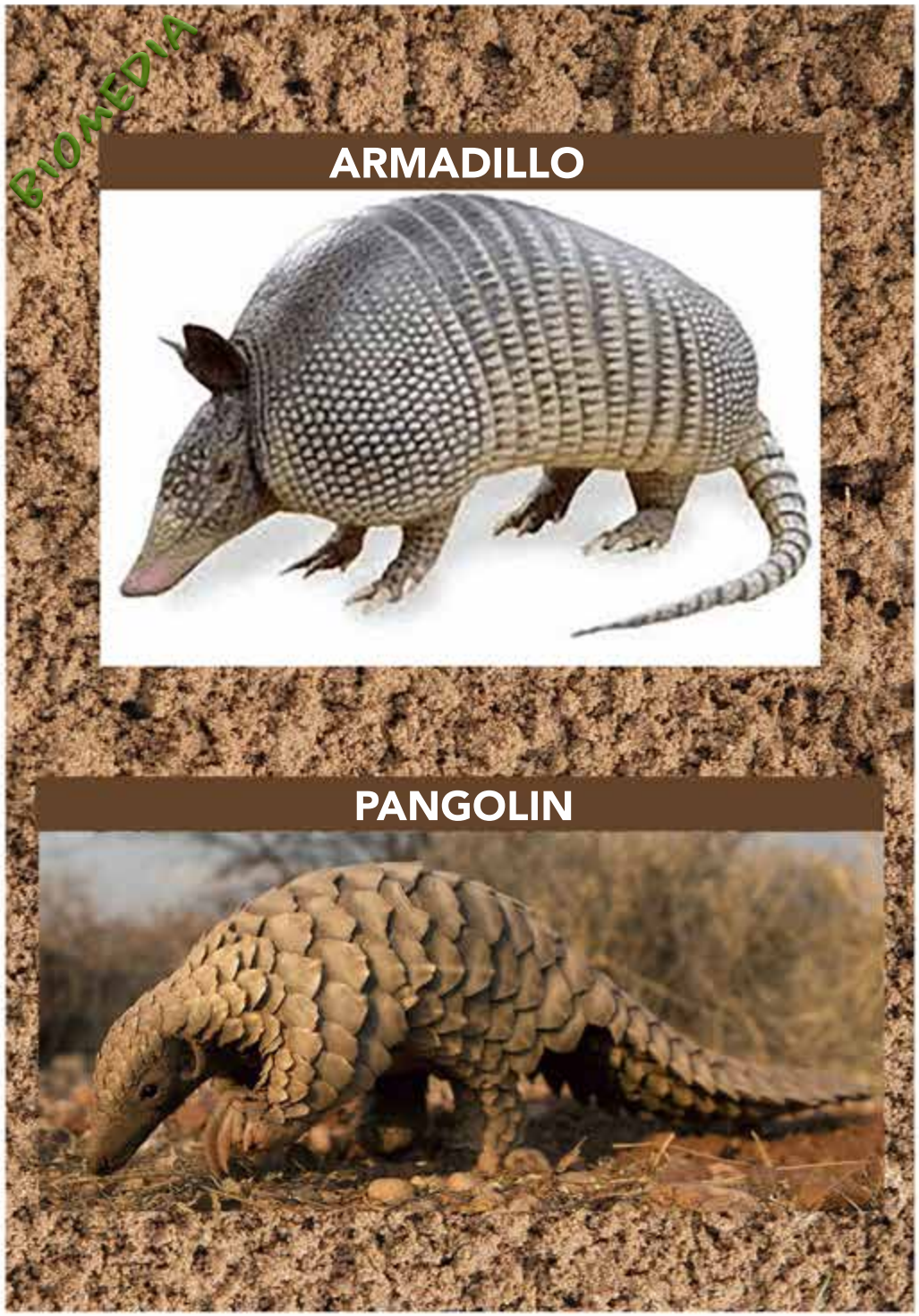
°Can fly up to 50 metres in one go

°Young stay with mothers until 10 months old

As tree-dwelling nocturnal animals with similar diets and habitats, these two species evolved similar traits, even though they are not closely related. Their similarities are understood to be a result of **convergent evolution.**

ANIMAL ANATOMY: CONVERGENT EVOLUTION

If two species face a similar problem, challenge, oropportunity, evolution may end up shaping them both in
similar ways. Pangolins and armadillos resemble each other so much that they would seem to be close cousins on the tree of life. Each of these mammals has a long, sticky, worm-like tongue, no teeth to speak of and sharp claws, a stomach as rugged as a cemind mixer and a hariless snout. However, there are also many differences between them:



ARMADILLO

°Lives in South, Central and North America

°Banded armour

°Grows up to 59 inches long and can weight up to 119 pounds

°Burrows under ground but mostly lives on solid ground

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PANGOLIN

°Lives in Sub Saharan Africa and Asia

°Scaly armour

°Grows up to 39 inches long and weighs up to 40 pounds

°Some species live in trees and climb; some burrow underground

At one time, pangolins were placed in the same group as armadillos, Edentata, but pangolins are now grouped with sloths in a separate order, Xenarthra. They evolved functionally similar traits due to similar dietary and environmental needs but are not closely related. Today the similarities between pangolins and armadillos are understood to be a result of **convergent evolution**.